FILE COPY FOREST INSECT LABORATORY, UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA.

621. 32H+

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

FOREST INSECT INFESTATIONS WEISER NATIONAL FOREST 1937

By
T. T. Terrell
Scientific Aide

Summary and Recommendations
James C. Evenden

Forest Insect Laboratory
Coeur d'Alene, Idaho
December 28, 1937

JMM
KAS
JEP
GRS
PCJ
TC
ASW
JSY

U. S. GOVERNMENT PRINTING OFFICE 60918

FOREST INSECT INFESTATIONS
WEISER NATIONAL FOREST
1937

At the request of the Regional Office Mr. Evenden made an extensive examination of the ponderosa pine stands of the Weiser National Forest in 1936 to determine the extent of insect damage. Information secured on this examination was discussed at a conference with Messrs. Farrell and Raphael of the Forest Service and Mr. Shellworth of the Boise-Payette Lumber Company early in 1937. During the conference it was decided that a more intensive survey would be made during the 1937 season, with the Bureau of Entomology assuming the responsibility for the work. The Regional forest office secured an appropriation of $1,700, which was given to the Bureau to finance the project.

During the month of October 1937 a survey crew of twelve men, which had been used on insect surveys in the northern part of the state, was moved onto the forest to do the work. Three additional men were hired from the forest protection force to bring the crew up to the required number of men necessary to complete the job. The men were given a period of training to acquaint them with the forest insects common to the locality and to instruct them as to the data to be secured. Practically all of the men had had much previous experience in insect survey work and had only to be acquainted with the work of the western pine beetle in ponderosa pine and the Douglas fir beetle in Douglas fir.

Although the survey was, primarily, to determine the losses in

the more valuable ponderosa pine stands, the Douglas fir stands were also cruised to secure data relative to any infestations that might be found. The method of making the survey consisted of examining sample strips of the area at approximately one-mile intervals. The strips were one chain wide and averaged 5½ miles in length. The data taken were recorded for each ten chains of strip (one acre) and consisted of a tabulation of the infested trees found, number of green ponderosa pine, and the amount of open area passed through. The infested ponderosa pine were recorded as those attacked in 1936, 1937 first generation, and 1937 second generation. In the infested Douglas fir, 1937 attacks only were counted. The infested Douglas fir are tabulated as bark-beetle killed and killed from other causes. Under other causes are many trees which seem to have been killed by flathead borers but may have been partially attacked by bark beetles.

A camp was first made at the Hornet Ranger Station. From this point a large area extending north to Cuprum and Bear Ranger Station, as well as east to the Weiser River was worked. The second move was made to Cambridge, where the Mann Creek, Middle Valley, and Indian Valley areas were covered. The last camp was made in New Meadows, from which strips were run in Long Valley, Meadows working circle, and north along the Little Salmon River.

The data have been tabulated as to forest working circles where applicable. However, the Council working circle was found to be too large and was broken up into the Hornet unit and the Council unit. In making this division the north and south highway is used as the dividing

point. The Council unit is that part of the Council working circle lying to the east of the highway, and the Hornet unit is the remainder of the Council working circle and lies west of the highway. In addition to the Weiser Forest working circles, some additional acreage was covered on adjacent forests. On the western side of Long Valley 27,400 acres of mixed types were surveyed, and in the Squaw Creek drainage south of Indian Valley 17,000 acres were covered. These two strips were run on the Nezperce Forest just north of the Meadows working circle. About 3,000 acres are included in this area, which is practically all ponderosa pine. The data are presented to show the relative conditions per acre for comparison.

In the following tables each unit or working circle is given separately. Although the total acreage covered is separated to show the approximate acreage of the different types, the types were so intermingled that they could not be run separately. Any data relative to trees per acre must be applied to the total acreage.

MEADOWS VALLEY WORKING CIRCLE

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
				1937			1937		
PP	DF	Total	1936	1st Gen	2nd Gen	Total	B.Beetles	Other	Total
101,500	32,000	133,500	.010	.003	.006	.009	.0013	.0007	.002

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
1,335	1,200	226

The acreage surveyed includes all of the privately owned timber in the Meadows Valley, as there was no distinction made between national forest and privately owned land.

The infestation in the Meadows Valley working circle is comparatively light. During the survey 1,447 acres of sample strip, which is but 1% of the total area, were examined and only 27 infested ponderosa pine were found (14 -- 1936, and 13 -- 1937). While a loss of approximately 1,250 trees a year seems serious, it is but .1½% of the stand, and would indicate nothing more than a normal condition. Only three infested Douglas fir were found--two killed by bark beetles (Dendroctonus pseudotsugae) and one by some other cause. This is also a normal condition. Of the total acreage of sample strip run, 83 percent was in ponderosa pine stands, while 17 percent was in open and other types.

HORNET UNIT

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
			1936	1937			1937		
PP	DF	Total		1st Gen	2nd Gen	Total	B. Beetles	Other	Total
93,900	26,800	120,700	.037	.022	.022	.044	.003	.012	.015

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
4,465	5,310	1,810

The infestation on the Hornet unit was approximately 19 percent heavier in 1937 than in 1936. The infestation is not evenly spread throughout the unit, but seems to consist of small spots of relatively heavy infestation with scattered infested trees between. One of these spots occurs near Paradise Flats, where in a small area the infestation runs about .08 infested tree per acre. There is a small area in the west fork of the Weiser River, where the infestation was .09 infested tree per acre in 1936 and .10 in 1937. This is the most heavily infested spot on the Hornet unit. However, the data do not show it to be increasing to any serious extent. An area between Johnson Creek and Lakey Creek shows a 1936 infestation of .08 per acre and a 1937 infestation of .09 per acre, which is about ½ of one percent of the stand.

COUNCIL UNIT

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
				1937			1937		
PP	DF	Total	1936	1st Gen	2nd Gen	Total	B. Beetles	Other	Total
36,100	20,700	56,800	.013	.030	.029	.059	.008	0	.008

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
738	3,351	454

The most heavily infested portion of the Council unit lies in the Middle Fork and Fall Creek area. The present infestation in this area runs .06, which is not a very serious condition. However, the 1936

infestation was very low in this locality, and the timber stands are relatively light. In 1937 approximately one percent of the stand was killed.

SNAKE RIVER WORKING CIRCLE

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
				1937			1937		
PP	DF	Total	1936	1st Gen	2nd Gen	Total	B.Beetles	Other	Total
19,500	23,700	43,200	.011	.005	.003	.008	.003	.019	.022

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
475	345	951

There is very little infestation in the ponderosa pine stands in the Snake River working circle. However, the Douglas fir is being killed to a considerable extent in some parts of the area. Nearly all of these trees were infested by flathead borers in the base, which may not be the primary destructive agent. Probably the greatest damage is being done in the Indian Creek drainage northeast of Cuprum. The heaviest killing seems to have occurred two or three years ago, as there are many groups of old kill present.

MIDDLE VALLEY WORKING CIRCLE

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
			1937				1937		
PP	DF	Total	1936	1st Gen	2nd Gen	Total	B. Beetles	Other	Total
10,000	5,800	15,800	.009	0	.023	.023	0	0	0

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
142	363	0

The Middle Valley working circle area is relatively free of infestation. The only drainage where more than an occasional infested tree was found was in Tamarack Creek, a fork of West Pine Creek. One sample strip run in that drainage showed an infestation of .09 per acre. The stands in this unit are light, and much of the area is open. Of the total acreage of sample strip run, 37 percent was in open and Douglas fir type.

Secondary beetles are killing patches of young pine in the Pine Creek area. There is considerable wood cutting in the vicinity, and the insects in all probability build up in the slash and stacked wood.

INDIAN VALLEY WORKING CIRCLE

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
			1937				1937		
PP	DF	Total	1936	1st Gen	2nd Gen	Total	B. Beetles	Other	Total
13,400	8,000	21,400	.055	.022	.060	.082	0	0	0

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
1,177	1,755	0

The infestation in the Indian Valley working circle seems to be a continuation of the Squaw Creek infestation that lies to the south. It is the heaviest infestation found on the forest and is somewhat concentrated near the Mill Creek Ranger Station. While the 1937 infestation destroyed approximately .9 percent of the stand, it does not show a serious increase over that of the previous season.

MANN CREEK WORKING CIRCLE

Acres of type surveyed			Infested trees per acre						
			Ponderosa pine				Douglas fir		
			1937				1937		
PP	DF	Total	1936	1st Gen	2nd Gen	Total	B.Beetles	Other	Total
8,700	7,700	16,400	.010	.005	.020	.025	0	.010	.010

Total Infested Trees Estimated on Area

Ponderosa Pine 1936	Ponderosa Pine 1937	Douglas Fir 1937
164	410	164

There is a very light infestation in the Mann Creek area. Only a normal western pine beetle infestation in ponderosa pine and a few Douglas fir were found. The Douglas fir, as in practically all the other areas, was found to have been killed by some indefinite cause.

The timber stands are mostly confined to strips along the creek bottoms and along the north slopes. Of 203 acres of sample strip run in the area, 27 percent was in open and Douglas fir type.

The following table presents the data for the entire forest.

Table I

WEISER NATIONAL FOREST

Unit	Acres strip	Acres area	Green stand per acre	Infested trees per acre: Ponderosa pine 1936	Ponderosa pine 1937 1st Gen	Ponderosa pine 1937 2nd Gen	Ponderosa pine 1937 Total	Douglas fir 1937 D.Beetles	Douglas fir 1937 Other causes	Douglas fir 1937 Total	Percent of stand infested PP 1936	Percent of stand infested PP 1937	Estimated total infested trees PP 1936	Estimated total infested trees PP 1937	Estimated total infested trees DF 1937
Meadows	1,447	133,500	6.2	.010	.003	.006	.009	.0013	.0007	.002	.16	.14	1,335	1,201	267
Hornet	1,899	120,700	7.2	.037	.022	.022	.044	.003	.012	.015	.51	.61	4,465	5,310	1,810
Council	623	56,800	5.1	.013	.030	.029	.059	.008	0	.008	.25	1.16	738	3,351	454
Snake River	370	43,200	4.9	.011	.005	.003	.008	.003	.019	.022	.22	.16	475	346	950
Middle Valley	219	15,800	3.8	.009	0	.023	.023	0	0	0	.24	.60	142	363	0
Indian Valley	183	21,400	9.3	.055	.022	.060	.082	0	0	0	.59	.88	1,177	1,755	0
Mann Creek	203	16,400	5.4	.010	.005	.020	.025	0	.010	.010	.18	.46	164	410	164
Total	4,944	407,800	6.3	.021	.014	.017	.031	.0027	.006	.009	.33	.49	8,496	12,736	3,645

In table 1 the percentage of the stand infested, as well as the infested trees per acre, have been given. It is thought that the percentage of the stand infested is somewhat more indicative of the status of the infestation than the actual number of infested trees per acre. It will be seen that, although the infested trees per acre in the Council unit are lower than that of the Indian Valley area, the percentage of stand infested is much higher.

The following table gives data secured on three units outside the Weiser National Forest.

Table II

Unit	Acres strip	Acres area	Green stand per acre	Infested trees per acre: Ponderosa pine 1936	Ponderosa pine 1937 1st Gen	Ponderosa pine 1937 2nd Gen	Ponderosa pine 1937 Total	Douglas fir 1937 D.Beetles	Douglas fir 1937 Other Causes	Douglas fir 1937 Total	Percent of stand infested PP 1936	Percent of stand infested PP 1937	Estimated total infested trees PP 1936	Estimated total infested trees PP 1937	Estimated total infested trees DF 1937
Long Valley	411	27,400	3.9	.007	0	.005	.005	0	.015	.015	.18	.13	192	137	411
Squaw Creek	146	17,000	3.6	.068	.055	.027	.082	.007	0	.007	1.89	2.28	1,156	1,394	119
Nezperce	40	3,000	6.6	.075	.025	.200	.225	0	0	0	1.14	3.41	225	675	0

The timber stands on the west side of the North Fork of the Payette River in Long Valley were surveyed to determine the extent of any infestations. The unit contained 27,400 acres with some good stands of pine, although much of the area is open. There is no infestation in the area, aside from an occasional infested tree.

The Squaw Creek unit, which lies just south of the Indian Valley working circle on the Payette Forest, has an infestation of practically the same nature as Indian Valley. Only 17,000 acres of this area were surveyed, and it is not known just how far south the timber stands extend.

The heaviest infestation found during the survey is north of the Meadows working circle on the Nezperce Forest. A small area of 3,000 acres of ponderosa pine was surveyed, which showed a heavy and evidently increasing infestation. In addition to the .225 infested trees per acre found on the sample strips, there was .100 of a tree per acre being attacked by flathead borers. This infestation extends north and east up the main Salmon and is very heavy in spots.

The timber stands within the checked areas on the enclosed map were those covered during the survey.

CONCLUSIONS

It is felt that, although there are some relatively small areas on the Weiser Forest where the infestation in ponderosa pine is above normal, the infestation is not in a dangerous status. The data secured

show that during 1937 the infestation increased throughout the forest by about 50 percent. Although this increase seems large, the infestation per acre is low and under such circumstances any fluctuation is apt to show a marked difference.

The Douglas fir in the vicinity of Indian Creek has been killed in large numbers during the past few years--probably to a much greater extent than at present. The past destruction of Douglas fir is also quite noticeable throughout the forest, one of the heavier spots being south of New Meadows near Fish Lake. As very little is known of the agent responsible for this destruction, a close watch should be kept on the infested areas.

While the timber stands of the Weiser Forest are relatively free from serious infestation, a serious outbreak of the western pine beetle in ponderosa pine and an epidemic of flathead borers exist on the Nezperce Forest to the north. Special care should be taken to watch the adjacent timber stands on the Weiser Forest to prevent the infestation from spreading into them undetected.

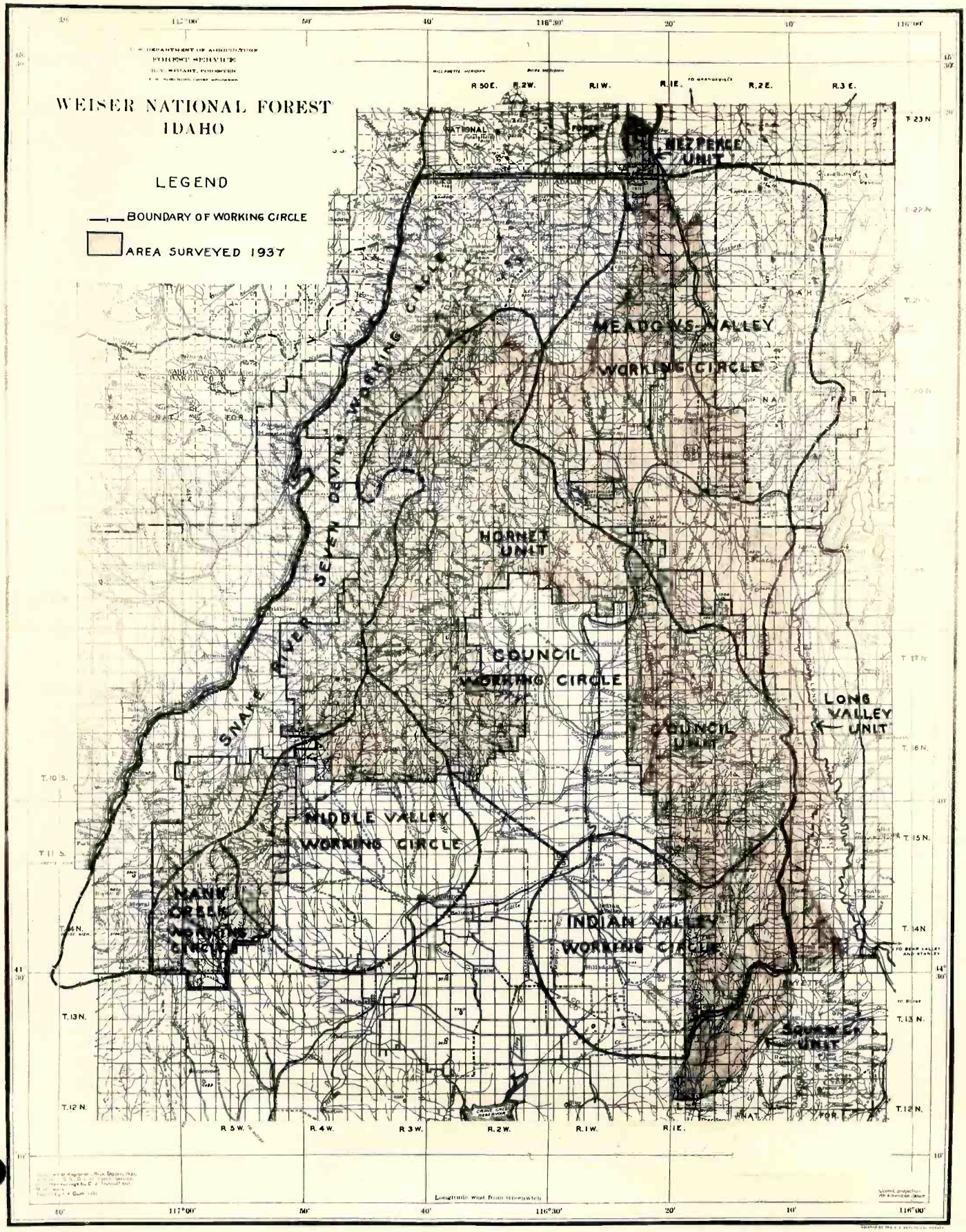
Respectfully submitted,

T. T. Terrell
Scientific Aide

COST ANALYSIS OF THE INSECT SURVEY

- - - - - -

Transportation	$287.81
Subsistence	188.50
Wages	1,091.84
Terrell's Salary, 1 month	175.00
Total Field Cost	$1,743.15
Effective Mandays	126
Noneffective Mandays:	
20 - Cook; 19½ Training; 58 - Leave and holidays; 30 - Travel; 16½ Camp construction	144
Supervision	41
Total Mandays	311
Cost per acre surveyed (455,700)	$.003
Miles of Sample Strip	692.6
Miles of Sample Strip per Effective Manday	5½


WEISER NATIONAL FOREST
IDAHO
LEGEND
BOUNDARY OF WORKING CIRCLE
AREA SURVEYED 1937
NEZ PERCE UNIT
MEADOWS VALLEY WORKING CIRCLE
SEVEN DEVILS WORKING CIRCLE
HORNET UNIT
COUNCIL WORKING CIRCLE
COUNCIL UNIT
LONG VALLEY UNIT
SNAKE RIVER
MIDDLE VALLEY WORKING CIRCLE
MANN CREEK WORKING CIRCLE
INDIAN VALLEY WORKING CIRCLE
SQUAW'S UNIT
R.5E.
R.2W.
R.1W.
R.1E.
R.2E.
R.3E.
R.5W.
R.4W.
R.3W.
T.23N.
T.22N.
T.17N.
T.16N.
T.15N.
T.14N.
T.13N.
T.12N.
T.10S.
T.11S.
117°00'
116°30'

FOREST INSECT SURVEY
WEISER NATIONAL FOREST
1937

- - - -

Summary and Recommendations
James C. Evenden

The forest insect survey of the Weiser National Forest provided data which permit an accurate depiction of the bark beetle infestations within that area. Though it is recognized that some discrepancies will exist in the data given for each unit due to errors in sampling, it is sufficiently accurate to permit the drawing of definite conclusions. In Mr. Terrell's presentation of data he has shown the status of the infestation for the different units. As there are a few areas which might be considered as border-line cases warranting a more detailed discussion, I desire to present our analysis of these situations.

Some difficulty was experienced in isolating the agency responsible for the death of many Douglas fir trees. In many instances the primary attacks were clearly those of the Douglas fir beetle, while in others only the attacks of flathead borers (Buprestidae) were revealed by a basal examination. Though it is possible that these trees could have been attacked and killed by flathead borers, it is believed that a more probable explanation, and one which is quite common, is that the upper portion of the bole was first attacked by the Douglas fir beetle, with a subsequent attack by flatheads in the base.

In his presentation of data Mr. Terrell shows the timber losses from bark beetle attack on an acreage basis as well as the percent of

total stand destroyed. On sample strips the number of living trees are recorded so that the percent of stand destroyed as well as the losses per acre can be shown. Though the losses for 1936 have been offered, it is recognized that the data are questionable as it was rather difficult to positively isolate those trees which had been attacked and killed during that year. It will be noted that these losses are computed on a tree basis which is subject to some criticism, when one attempts to consider losses in terms of volume rather than trees. However, if discrepancies occur they will minimize the seriousness of the losses in ponderosa pine, for the trees attacked and killed by bark beetles were of greater volume than the residual stand.

In considering the forest as a unit, the infestations of the western pine beetle and Douglas fir beetle are not considered as being overly serious at this time. However, there are a few areas which should receive further consideration and be kept under careful observation. I refer to the Indian Valley unit of the Weiser Forest; the Squaw Creek unit, which lies to the south of the Indian Valley unit, on the Payette Forest; and the so-called Nezperce unit, which is on the Nesperce Forest north of the Meadows working circle of the Weiser. It will be noted that these three units are now carrying an infestation which approaches an epidemic status. Though on these three respective units there are only .082, .082, and .225 infested ponderosa pine trees per acre, it represents a loss of .55, 2.28, and 3.41 percent of the total number of trees within the area. These figures are somewhat startling, for it is apparent that the losses are considerably in excess

of the annual increment, and that if the infestation continues with its present severity the merchantable volume of the timber stands will be seriously deleted in a very few years. Though these areas do not support a very heavy stand of timber, the data as given by Mr. Terrell in tables I and II of his report show the average number of green trees per acre for the total acreage of different units.

In addition to these three units the percent of stand destroyed on the Council unit of the Weiser Forest is rather high, being 1.16; however, the number of infested trees per acre is only .059. In this instance a relatively light infestation per acre is destroying a high percentage of the timber stand, due to the fact that there are only 5.1 green trees per acre.

It is apparent that for some time there has been a constant loss within all ponderosa pine stands. It is obvious that the continuation of this loss, which in the three areas mentioned is heavier than anticipated, will continue to reduce the volume of the residual stand, leaving it in an unmerchantable condition. Though control measures are not considered advisable at this time, it is recommended that a follow-up survey of the Council, Indian Valley, Squaw Creek, and the Nezperce units be made in the fall of 1938 for the purpose of checking upon the status of infestations at that time with a view toward recommending the institution of control if the situation has not abated. The Forest Insect Laboratory at Coeur d'Alene, Idaho will try and assume the responsibility of these check surveys without

a special allotment for that purpose.

The status of the Douglas fir beetle infestation in Douglas fir is not considered as being of sufficient seriousness to warrant control.

Respectfully submitted,

James C. Evenden
Entomologist